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A Revision of the Philomastigine Sawflies of the World (Hymenoptera: Pergidae)

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Abstract.—The world genera and species of Philomastiginae (*Cerospastus* Konow, *Ecopatus* Smith and *Philomastix* Froggatt) are revised and an illustrated, identification key is provided. *Cerospastus volupis* Konow and *Ecopatus penai* Smith from South America and *Philomastix nancarrowi* Froggatt, *P. macleaii* (Westwood) and ***P. xanthophylax* sp. n.** from eastern Australia are described or redescribed. Larvae of *C. volupis* feed on foliage of species of *Nothofagus* (Fagaceae); those of *Philomastix* on foliage of *Rubus* (Rosaceae) or *Alphitonia* (Rhamnaceae). All species of *Philomastix* exhibit maternal guarding of eggs and larvae. The trans-Antarctic distribution of the Philomastiginae suggests a Gondwanan origin for the subfamily.

Distinctive Gondwanan elements are now known within numerous Australian families of Hymenoptera (Naumann 1991). Over a dozen families or subfamilies and even a few genera are shared by Australia and South America or by Australia, South America, New Zealand and southern Africa. Examples of such trans-Antarctic distribution patterns can be found among the Symphyta, Megalyroidea, Evanioidea, Ichneumonoidea, Proctotrupoidea, Platygasteroidea, Chalcidoidea, Vespoidea and Apoidea and include phytophages, parasitoids and predators. Generally these Gondwanan elements are readily recognisable as archaic clades within their respective superfamilies or families. Some, such as the parasitoid genus *Monomachus* Klug (family Monomachidae) are morphologically conservative and comprise in total only a few dozen species (Johnson 1992). Some, such as *Monomachus*, are very rarely collected or are restricted to temperate, forest habitats. In contrast such Gondwanan groups as the thynnine Tiphiidae are spectacularly varied and speciose; the many hundreds of species (Naumann 1991) occur over a wide range of habitats and some of these species are extremely common.

Seven subfamilies or tribes of Symphyta, the Dereycyrtinae (Xiphydriidae), the Guiglini and Leptorussini (Orussidae), the Scobini (Argidae), and the Pergulinae, Perreyinae and Philomastiginae (Pergidae) all exhibit trans-Antarctic distribution patterns. The Dereycyrtinae comprises the monotypic *Austrocyrta* Riek in Australia and three genera totalling sixteen species in South America (Smith 1988; Smith 1995). Larvae of this subfamily are unknown but probably develop within wood. The Guiglini comprise six Australian and two New World species, and the Leptorussini consist just a South American species, five Australian species and a species in South Africa (Smith 1988). All orussid larvae are believed to be ectoparasitic on the larvae of wood-boring beetles and siricid wood wasps. The orussid tribe Ophrynopini, with representatives in south-east Asia and South America might also be considered to be a "trans-Antarctic" taxon (N. Springate, pers.comm.). The Scobinini comprise *Scobina* Lepeletier and Serville, a common New World genus of

about 50 species, and *Antargidium* Morice, an Australian genus of six species (Naumann 1991). Larvae of two species of *Scobina* feed on *Sida* Linnaeus (Malvaceae) but nothing is known of the biology of *Antargidium*. The subfamily Pergulinae (Pergidae) comprises the genus *Haplostegus* Konow with fifteen species in South America and the monotypic *Pergula* Morice in south-western, mainland Australia (Smith 1990). The biology of the single, rare species of *Pergula* is unknown but larvae of the South American pergulines have been recorded feeding on Myrtaceae, especially *Psidium guajava* L. (guava). Perreyinae are represented on the western side of the Pacific ocean by two species with flightless females (described respectively from Sulawesi and New Guinea) and east of the Pacific by about 80 species in South America (Smith 1990). Larvae of South American species feed variously on Asteraceae and Malvaceae. The Philomastiginae consists of two monotypic South American genera, *Cerospastus* Konow and *Ecopatus* Smith, and three eastern Australian species of *Philomastix* Froggatt (Fig. 75). The two previously described species of *Philomastix* are well known species of tropical and subtropical rainforests. Their larvae feed on the foliage of species of *Rubus* L. (Rosaceae) (Leask 1944) or *Alphitonia* Reissek ex Endl. (Rhamnaceae) (Jackson 1993) and females are commonly encountered standing guard over egg batches and young larvae (Fig. 72). Members of the subfamily can be recognised using the keys of Smith (1990) and Naumann (1991).

The present paper revises the generic diagnoses and key of Smith's (1990) treatment of the South American Philomastiginae, redescribes all previously named species, describes a new species of *Philomastix* from south-eastern Queensland (Fig. 1), and collates all known biological and distributional data on the subfamily. Morphological and biological studies of the larvae of *Philomastix* are continuing (Groth and Naumann unpublished).

Fig. 1. *Philomastix xanthophylax*. Scale line = 2mm.

TERMINOLOGY

The morphological terminology used here follows Goulet and Huber (1993).

DEPOSITORIES

AMSA	Australian Museum, Sydney, Australia
ANIC	Australian National Insect Collection, CSIRO Division of Entomology, Canberra, Australia
BPBM	Bernice P. Bishop Museum, Honolulu, Hawaii, U.S.A.
CNC	Canadian National Collections of Insects, Arachnids and Nematodes, Ottawa, Canada
BCRI	Biological and Chemical Research Institute, N. S. W. Department of Agriculture, Rydalmere, Australia
BMNH	The Natural History Museum, London, U. K.
DEIC	Institut für Pflanzenschutzforschung der Akademie der Landwirtschaftswissenschaften (formerly:Deutsches Entomologisches Institut, Eberswalde, Germany)
FCNI	State Forests Research Institute, Beecroft, Australia

HGCN H. Groth Collection, "Timbarrah," via, Crows Nest, Australia
MVMA Museum of Victoria, Melbourne, Australia
UMO Hope Department of Entomology, University Museum, Oxford, U. K.
QMBA Queensland Museum, Brisbane, Australia
QDPI Entomology Collection, Queensland Department of Primary Industries, Brisbane, Australia
SAMA South Australian Museum, Adelaide, Australia
UQIC Department of Entomology, University of Queensland, Brisbane, Australia
USNM National Museum of Natural History, Smithsonian Institution, Washington, D. C., U. S. A.

PHILOMASTIGINAE Rohwer

Pterygophorinae (part): Froggatt 1890b: 696; Ashmead 1898: 231.
Ptergophorides (part): Konow 1898: 248; Konow 1905b: 37.
Philomastiginae Rohwer 1911a: 220; Benson 1935: 224; Benson 1938: 379; Riek 1970a: 891; Riek 1970b: 218; Smith 1978: 159; Naumann 1984: 345, 347; Smith 1990: 13, 21–23; Naumann 1991: 934–935; Macdonald and Ohmart 1993:493–495.

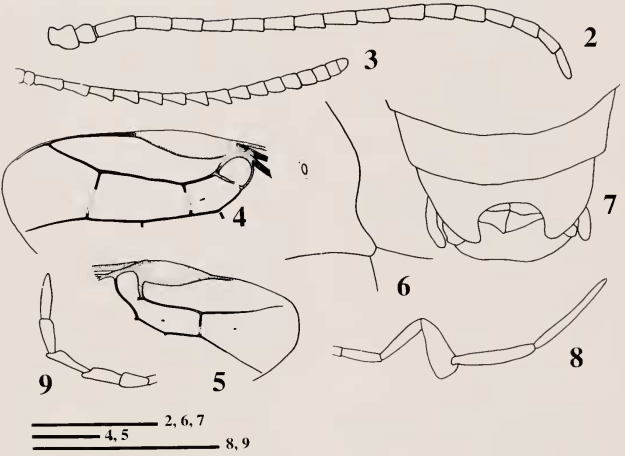
Diagnosis.—Antenna 14–21-segmented, filiform in female, serrate in male. Head capsule open (neither postgenae nor hypostomae forming continuous bridge between occipital and foramen and oral fossa). Maxillary palp 4- or 6-segmented; labial palp 3- or 4-segmented. Labium apically single or tri-lobed. Ventral arms of cervical sclerites pointed, neither meeting nor forming precoxal bridge with prosternum; notauli complete; mesothoracic sternopleural suture present; distance between cenchri less than half width of cenchrus. Mid- and hind tibia each with preapical spine; foretibia with 2 apical spines. Costa of forewing narrower than intercostal area; forewing without anal cell. Abdominal tergum 1 sclerotised.

KEY TO GENERA OF PHILOMASTIGINAE

1. Maxillary palp 4-segmented; labial palp 3-segmented, apical segment with large sensory cup occupying more than half length of segment (Fig. 70), maxillary palp with smaller sensory cup; labium single lobed; female without cercus ..... ***Philomastix*** Froggatt
– Maxillary palp 6-segmented; labial palp 4-segmented, apical segments without sensory cup; labium tri-lobed; female with cercus 2
2. Forewing with 4 cubital cells (1R1, 1Rs, 2Rs, 3Rs) (Fig. 4); forewing radial cell closed; fourth maxillary palp segment slender (Fig. 9); antenna of female weakly clavate (Fig. 3); mesoscutum conspicuously setose ..... ***Cerospastus*** Konow
– Forewing with 2 or 3 cubital cells; fore-wing radial cell open (Fig. 5); fourth maxillary palp segment apically distinctly wider than other segments (Fig. 8); antenna of female not clavate (Fig. 2); mesoscutum almost devoid of setae ..... ***Ecopatus*** Smith

PHILOMASTIX Froggatt

Philomastix Froggatt 1890a: 487–488; Froggatt 1890b:696; Froggatt 1901: 1070; Dalla Torre 1894: 308; Ashmead 1898: 231; Konow 1898; 248, 249; Konow 1905: 36–37; Schulz 1906: 81–82; Rohwer 1911: 87; Morice 1919: 248, 255, 287; Tillyard 1926: 265; Benson 1935: 224; Benson 1938: 379–380; Riek 1970a: 880, 889, 891; Smith 1978: 159; Smith 1990: 21–23; Pagliano and Scaramozzino 1990: 157; Abe and Smith 1991: 65; Naumann 1991: 926, 933, 935; Macdonald and Ohmart 1993: 493–496; Naumann 1994: 414–415. Type species: *Perga nan-*



Figs. 2–9. *Ecopatus penae, Cerospastus volupis*: 2, *E. penae,* female antenna; 3, *C.volupis,* female antenna; 4, *C. volupis,* forewing (part); 5, *E. penae,* forewing (part); 6, *E. penae,* lateral panel of first abdominal tergum; 7, *C. volupis,* apex of male abdomen, dorsal view; 8, *E. penae,* maxillary palp palp; 9, *C. volupis,* maxillary palp. Scale lines = 1.0 mm.

carrowi Froggatt (designated by Rohwer 1911).

Perga Leach: Westwood 1880: 372; Kirby 1882: 26. Dalla Torre 1894: 351. (part)

Heptacola Konow: Konow 1905a: 167 (part)

Female.—Vertex conspicuously setose. Face with some fine microsculpture. Malar space narrower than diameter of anterior ocellus. Antenna 14–19-segmented, weakly serrate, not clavate. Right mandible simple (Fig. 69). Maxillary palp 4-segmented, filiform (Fig. 70); apical segment with conspicuous sensory cup, this less than half as long as segment. Labial palp 3-segmented, apical segment with conspicuous sensory cup, this more than half as long as segment. Labium single lobed. Thorax dorsally conspicuously setose. Notauli, median mesoscutal line deeply impressed. Mesoscutellum swollen so that posterior margin concealed from above. Mesepisternum with tubercle. Metascutellum in form of transverse band. Forewing with closed radial cell and 4 cubital cells (e.g. Fig. 1). Median, second cubital and third cubital cells each with nygma (small, corneous spot). Abdominal terga dorsally densely setose. Second tergum predominantly smooth. Cercus absent. Ovipositor sheath posteriorly strongly expanded, in posteroventral view with prominent, flattened, semicircular surface (e.g. Fig. 21).

Head, mesoscutellum, metascutellum orange-yellow. Legs brown to dark brown. Wings with background smokey brown appearance, especially in female. Costal cell of fore wing distinctly more darkened than remainder of wing.

Male.—Antenna 15–21-segmented, strongly serrate (e.g. Fig. 11). Eighth tergum pos-

teriorly with moderate or very weak emargination (e.g. Fig. 20).

Discussion.—Larvae of *Philomastix* have long been known to feed externally on leaves of various shrubby and scandent species of *Rubus* (known as blackberries or native raspberries) (Leask 1944). More recently (present paper and Jackson 1993) *Philomastix* larvae have been discovered defoliating trees of the genus *Alphitonia* (Figs. 72–74). Two species of *Alphitonia* are attacked: *Alphitonia petriei* Braid & C. T. White, the pink ash, which is widespread in Queensland and the northern part of the Northern Territory, and *Alphitonia excelsa* (Fenzl) Benth., the red ash, which occurs in rainforests and eucalypt woodlands of Queensland, New South Wales, and the northern parts of the Northern Territory and Western Australia (Francis and Chippendale 1970; Lazarides and Hince 1993). The hosts of *Philomastix* are thus a shrub and a tree from different plant families. *Rubus* and *Alphitonia* do have at least one, ecological characteristic in common—both are pioneer species. Various *Rubus* are well known species of paths, clearings and margins of closed forests and *A. petriei* is the most prominent recolonising tree species in upland rainforest clearings in north Queensland (Jackson 1993).

A species of "*Philomastix*" has been recorded feeding on *Eucalyptus* sp. at Launceston, Tasmania (Anonymous 1980). This is almost certainly a misidentification: it is the only record of a eucalypt as host and we have seen no authentic specimens of *Philomastix* from Tasmania in the course of this revision.

Philomastix does not occur over the entire range of its host plants. The sawfly genus is restricted to the eastern Australian states of Queensland and New South Wales between the latitudes 16°S and 35°S. However *Alphitonia* occurs beyond this range in the Northern Territory and Western Australia and suitable species of *Rubus* are common in Victoria (Bruzzese 1980).

P. nancarrowi and *P. macleaii* are strictly allopatric (Fig. 76). *P. nancarrowi* is confined to the rainforests and closely adjacent eucalypt woodlands of the Queensland Wet Tropics between the northern end of the Atherton Tableland and the Mount Spec-Paluma area. Almost all specimens have been collected at altitudes above 500m. *P. macleaii* is very widely distributed from Eungella in central Queensland to the Illawarra district in south-eastern New South Wales. It occurs in tropical, subtropical and temperate rainforest and nearby moist woodlands. In the northern parts of its range (Eungella, Kroombit tops, Bunya Mountains) *P. macleaii* is not known below 1000m but south of about Brisbane it occurs near sea level. The region of eastern Queensland between Paluma and Eungella which separates *P. nancarrowi* and *P. macleaii* is relatively dry; the vegetation is dominated by eucalypt woodland and there are no significant patches of rainforest. North from Paluma the so-called "base-of-peninsula" rainforest system stretches with some interruptions to Cooktown. On the other hand Eungella stands as the northern extremity of a rainforest system that extends, also with interruptions, all the way to southern New South Wales. There are taxonomic discontinuities in several orders of insects (especially mesothermic Odonata, Plecoptera and Megaloptera) at the gap between Paluma and Eungella (Kikkawa et al. 1981; Watson and Theischinger 1984) and these are thought to reflect Pleistocene fluctuations in climate. During Pleistocene glacial periods, increased aridity resulted in a contraction of the rainforests and a pronounced inhospitable gap between moist refugia north of Paluma and south of Eungella. Presumably vicariance speciation occured on either side of this barrier within *Philomastix* and various odonate, stonefly and alderfly genera.

P. xanthophylax has a much more circumscribed distribution pattern (Fig. 76). It has been collected in moist woodlands

rather than rainforest but in the Brisbane area it is sympatric with *P. macleaii*. There is at present no model to explain the origin of this species.

The oviposition behaviour of *Philomastix* is unusual for a pergid sawfly. The adult female pierces the leaf of the host plant, pushes each elongate egg through the perforation, and attaches one end of the egg to the underside of the leaf (Macdonald and Ohmart 1993). The other end of the egg is pushed free of the lower surface of the leaf. The more typical behaviour for pergids is to cut a shallow slit in the host plant and insert the egg into this slit. The lancet of most pergids is saw-like in appearance but the lancet of *Philomastix* (Figs. 22, 39, 58, 71) is auger-shaped, presumably to facilitate the "pierce-and-push" oviposition habit.

All species of *Philomastix* exhibit maternal care. Females stand over or near their egg masses and young larvae (Fig. 72). When disturbed they shake from side to side and rapidly vibrate their wings to produce a loud buzzing sound. Females will guard their offspring, usually from a position on a petiole or stem, and have been observed to guide larvae to new leaves (Leask 1944). Females eventually die at their post, and sometimes dozens of dried bodies remain hanging on defoliated host plants. Parental defence of offspring is widespread within the Symphyta. It has been recorded in three other subfamilies of Pergidae (Naumann 1984; Macdonald and Ohmart 1993) and in the Pamphiliidae (Kudô et al. 1992). In those species which have been studied quantitively it has been shown that female guarding reduces predation on eggs by other arthropods.

KEY TO SPECIES OF *PHILOMASTIX*

1 Female; abdomen with saw-like ovipositor often concealed within sheath (Figs. 1, 21, 46, 55) 2
– Male; ovipositor and sheath absent 4
2 Abdomen orange-yellow (Fig. 1); antennal flagellum black; ovipositor sheath posteromedially dentate (Figs. 54, 55) ..... ***xanthophylax*** sp.n.
– Abdomen with extensive dark brown, black and cream markings (Figs. 62,64); antennal flagellum orange-yellow; ovipositor sheath not posteromedially dentate (Figs. 21, 46) 3
3 Mesoscutellum usually with posterolateral tubercles (Figs. 30–34); mesepisternal tubercle strong (Fig. 38); abdominal terga 3–5 usually with cream, lateral maculae visible from above (Fig. 62); posterolateral margin of first abdominal tergum weakly curved or straight (Fig. 37), spiracle separated from margin of tergum by a distance 0.9–1.1 times maximum diameter of spiracle ..... ***macleaii*** (Westwood)
– Mesoscutellum without posterolateral tubercles (Fig. 16) although sometimes posteriorly emarginate; mesepisternal tubercle usually weak (Fig. 26); abdominal terga 3–5 without lateral, cream maculae visible from above (Fig. 64); posterolateral margin of first abdominal tergum strongly curved almost angulate (Fig. 19), spiracle separated from margin of tergum by a distance 1.6–1.7 times maximum diameter of spiracle ..... ***nancarrowi*** Froggatt
4 Mid lobe of mesoscutum with brown to black coloration reaching anterior margin (Fig.63); diameter of anterior ocellus 0.9–1.0 times minimum distance between antennal sockets; sixth abdominal tergum with lateral, cream or orange-yellow macula visible from above (Fig. 63); mesoscutellum usually with posterolateral tubercles ..... ***macleaii***(Westwood)
– Mid lobe of mesoscutum reddish orange anteriorly and brown to black posteriorly or lobe entirely reddish orange; diameter of anterior ocellus approximately 0.7 times minimum distance between antennal sockets; sixth abdominal tergum usually without orange or yellow maculae visible from above; mesoscutellum without tubercles, although posterior margin sometimes distinctly concave 5
5 Seventh abdominal tergum with widely separated, yellow or orange maculae; posterolat-

eral margin of first abdominal tergum strongly curved, almost angulate (as in Fig. 19); mesoscutellum posteriorly weakly emarginate (Fig. 17) or straight ..... ***nancarrowi*** Froggatt

– Seventh abdominal tergum with yellow or orange band across posterior margin, band sometimes narrowly interrupted medially; posterolateral margin of first abdominal tergum weakly curved (as in Fig. 53) or straight; mesoscutellum posteriorly straight or weakly convex ..... ***xanthophylax*** sp.n.

Philomastix nancarrowi Froggatt
(Figs. 10–26, 64–66, 76)

Philomastix nancarrowi Froggatt 1890a: 488–489; Froggatt 1890b: 696; Konow 1898: 250; Schulz 1906: 82–83; Rohwer 1911B: 87; Morice 1919: 287–288, Plate XI, fig. 13, Plate XII, figs 5,6, Plate XIII, fig. 15; Leask 1943: 2; Leask 1944: 1–3; Smith 1978: 159; Bruzzese 1980: 4; Abe and Smith 1991: 65; Macdonald and Ohmart 1993: 493–494; Naumann et al. 1994: 71.

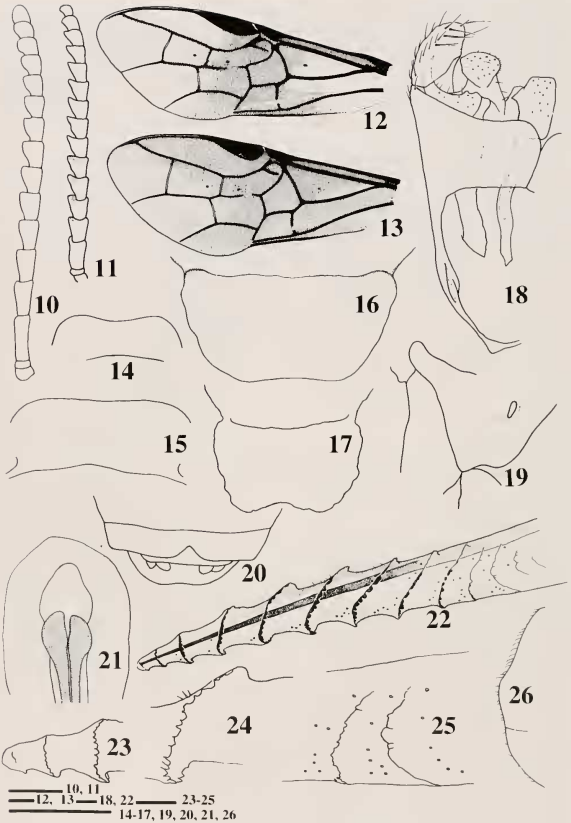
Philomastix naucarrowi: Dalla Torre 1894: 308; Konow 1905: 37; Rohwer 1911: 87. (Misspelling)

nec Philomastix nancarrowi : Forsius1927: 283. (Misidentification)

Female.—Body length 9.5–11.0 mm. Forewing length 10.6–12.3 mm. Distance between antennal sockets 2.8–3.9 times diameter of anterior ocellus. Antenna (Fig. 10) 15–18-segmented; apical 2–4 segments sometimes fused so that antenna apparently 13–16-segmented (traces of intersegmental sutures sometimes present). First flagellar segment 2.8–3.8 times longer than wide. Second flagellar segment 1.7–1.9 times wider apically than basally. Mesoscutellum without posterolateral tubercles, posteriorly rounded or weakly emarginate (Fig. 16); anterodorsal surface flat (Fig. 15) to weakly concave. Mesepisternal tubercle weak (Fig. 26). Ovipositor sheath not posteromedially dentate (Fig. 21). Posterolateral margin of first abdominal tergum strongly curved (Fig. 19), almost angulate, spiracle separated from margin by a distance 1.6–1.7 times maximum diameter of spiracle. Lancet as in Figs. 22–25, about 8 ctenidia terminating in dorsal tooth, anterior teeth weak

Flagellum orange-yellow. Mid lobe of mesoscutum orange-yellow (Fig. 64). Each lateral lobe of mesoscutum with large, dark brown to black macula occupying most of length of lobe. Mesepisternum with broad, brown band adjacent to sternopleural suture (Fig. 66). Mesosternum brown with narrow, orange-yellow band along anterior and lateral margins. Metascutum orange-yellow to pale brown, usually not much darker than cenchri. Forewing with broad, transverse, brown band; cell 1M usually completely brown (Fig. 12) or forewing entirely brown (Fig. 13). Abdomen predominantly dark coloured with some metallic reflections. Abdominal tergum 1 orange-yellow to pale brown. Terga 3–5 dark brown, black or metallic blue. Terga 6 and 7 each with cream, lateral macula; maculae narrowly separated middorsally by dark brown or black, or maculae contiguous. Tergum 8 cream. Tergum 9 orange-yellow. Abdominal sterna 2 and 3 at least in part orange-yellow or cream. Sterna 4–7 dark brown to black. Ovipositor sheath orange-yellow.

Male.—Body length 7.1–9.4 mm. Forewing length 7.1–8.1 mm. Distance between antennal sockets 1.7–2.0 times diameter of anterior ocellus. Antenna (Fig. 11) 15–17-segmented, apical 2 segments sometimes fused. First flagellar segment 1.6–2.0 times wider than long. Second flagellar segment 1.8–2.2 times wider apically than basally. Mesoscutellum sometimes distinctly emarginate posteriorly (Fig. 17); anterodorsal surface usually more concave (Fig. 14). Mesepisternal tubercle as in female. Tergum 8 posteriorly with deep emargination (Fig. 20). Genitalia as in Fig. 18, paramere moderately broad, gonolacinia not strongly hooked, penis valve truncate.



Figs. 10–26. *Philomastix nancarrowi*: 10, female antenna; 11, male antenna; 12, 13, forewings; 14, male mesoscutellum, surface contour as seen from rear of insect; 15, female mesoscutellum, surface contour as seen from rear of insect, 16, female mesoscutellum, dorsal view; 17, male mesoscutellum, dorsal view; 18, male genitalia, dorsal view; 19, lateral panel of first abdominal tergum; 20, apex of male abdomen, dorsal view; 21, apex of ovipositor sheath, posteroventral view; 22–25, lancet; 26, mesepisternum, profile. Scale lines = 1.0 mm for 10–17, 19–21, 26; = 0.1 mm for 18, 22–25.

Clypeus and labrum creamy white. Mid lobe of mesoscutum anteriorly orange-yellow, posteriorly brown (Fig. 65). Lateral lobe of mesoscutum entirely brown to dark brown. Abdominal terga 5 and 6 without orange-yellow, lateral maculae. Tergum 7 with lemon-yellow, lateral macula.

Type.—Holotype female, Cairns (ANIC, on permanent loan from Macleay Museum, University of Sydney, examined).

Material examined.—Queensland: 1 female, Myola, 1909 (ANIC); 10 females, 22 males, Kuranda, IV. 1902, R. E. Turner (BMNH, USNM, QMBA); 1 female, same locality, 3. V.-20. VI. 1913, R. E. Turner (BMNH);1 male, same locality, 15. IV. 1931, A. N. Burns (MVMA); 1 female, same locality, H. J. Carter (AMSA); 1 female, 2 males, 1.5 km SE Kuranda, 16–17. V. 1980, I. D. Naumann, J. C. Cardale (ANIC); 2 females, Barron Falls, via Kuranda, 16. VI. 1971, E. F. Riek (ANIC); 1 female, Cairns, 1905, H. Elgner (ANIC); 1 male, Cairns district, F. P. Dodd (SAMA); 1 female, Danbulla (forestry Reserve), 14. V. 1959, G. W. S. (BMNH);1 female, Mt Baldy,approximately 8 km W of Atherton, 13. I. 1977, M. S. and B. J. Moulds (AMSA); 1 male, 12 miles (19.3 km) from Ivanhoe (?Mine), 5. III. 1961, R. Straatman (ANIC); 1 female, Herberton, 17. III. 1922 (QMBA); 1 female, same locality, 30. V. 1943, M. F. Leask (QMBA); 4 females, same locality, 4. VI. 1944, M. F. Leask (AMSA); 3 females, Eubenangee, 14. V. 1950, G. Brooks (MVMA); 1 female, Bartle Frere, 5. V. 1928 (QDPI); 1 female, Laceys Creek, Mission Beach, 22. IV. 1970, S. R. Curtis (ANIC); 1 female, Tully, 24. IV. 1931, A. N. Burns (MVMA); 1 female, 4 miles (6.4 km) W Paluma, 13. IV. 1969, I. F. B. Common, M. S. Upton (ANIC); 2 females, Paluma, II.-IV. 1992, R. Jackson (ANIC);18 females, Little Crystal Creek, Mt Spec, 16. V. 1971, E. F. Riek (ANIC). Unlocalised: 2 females, "North Queensland," V. 1944, M. F. Leask (QMBA); 1 female, "Atherton Tableland," 14. III. 1934 (QDPI); 1 female, "Atherton Tableland," 19. III. 1958, N. H. L. Krauss (USNM); 1 female (QMBA).

Distribution.—See Fig. 76. The series split between the BMNH, USNM and QMBA is labelled "Cairns Kur 4. 02." I have interpreted this as meaning that the specimens were collected at Kuranda, a well known entomological collecting locality approximately 15 km north west of Cairns. Locality labels for specimens collected at Kuranda during the early 1900s commonly bear the additional information "Cairns" or "Cairns district." The collector's name is omitted from the USNM and QMBA specimens. Forsius (1927) recorded *P. nancarrowi* (and *P. macleaii*) from specimens collected at Dorrigo, in north eastern New South Wales by W. Heron and deposited in the SAMA. I have re-examined these specimens and all are clearly identifiable as *macleaii*.

Discussion.—One male from Mt Lewis, north Queensland listed below under "Other material examined", differs significantly from the description of *P. nancarrowi* males given above. In the Mt Lewis male the mesoscutellum is rather truncate posteriorly and thus approaches the tuberculate condition of *P. macleaii*; tergum 8 is only weakly emarginate; the dark brown coloration of the vertex does not extend to the posterior surface of the head; and the the clypeus, labrum and mesoscutum are all orange-yellow. The specimen may represent an extreme of variation in *P. nancarrowi* or an additional, undescribed species. It is perhaps not surprising that an anomalous *Philomastix* occurs on Mt Lewis. The mountain is the most northerly, known locality for the genus. It is part of the Carbine Tableland, a discrete, rainforest-covered upland remarkable for the uniqueness of its fauna. The Carbine Tableland supports the highest number of endemic vertebrate species in the Queensland Wet Tropics (Nix 1991) and Mt Lewis itself harbours several endemic species of insects: a stag beetle of the genus *Sphaenognathus* Buquet which is

known elsewhere only from the Blackdown Tableland in central Queensland and Andean South America (Moore 1978; Monteith 1996), a primitive leafhopper representing a tribe otherwise unknown from Australia but recorded from Madagascar, New Zealand, Chile and Juan Fernandez and a species of flightless dung beetle (Kikkawa et al. 1981).

Larval host plants.—Rosaceae: *Rubus rosifolius* Sm. (Leask 1943, 1944); *Rubus hillii* F. Muell.(Leask 1944; Bruzzese 1980); *Rubus moluccanus* L. (Bruzzese 1980). Rhamnaceae: *Alphitonia petriei* (Jackson 1993).

Other material examined.—QUEENSLAND: 1 male, Mt Lewis, via Julatten, 4. V. 1970, S. R. Curtis (ANIC).

Philomastix macleaii (Westwood)
(Figs. 27–47, 62, 63 76)

Perga macleaii Westwood 1880: 372–373, Plate XXXV, fig. 2.; Kirby 1882: 26.

Perga macleayi : Dalla Torre 1894: 351 (unjustified emendation).

Heptacola macleayi : Konow 1905a: 167.

Philomastix macleaii : Froggatt 1918: 671; Smith 1978: 159; Bruzzese 1980: 4; Smith 1980: 342; Macdonald and Ohmart 1993: 493–494; Naumann 1993: 8, 115, 183.

Philomastix macleayi : Morice 1919: 248, 265, 287–288; Tillyard 1926: 265, Plate 21, fig. 2; Forsius 1927:283 (part).

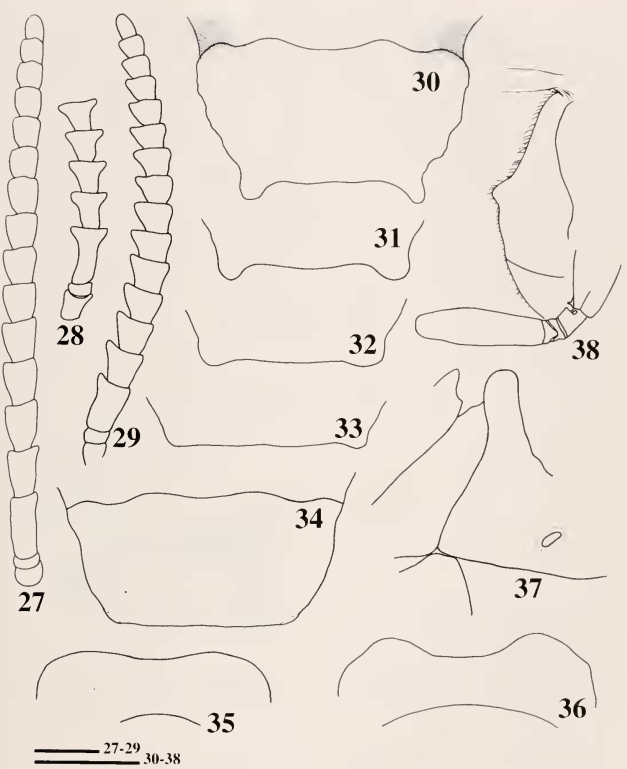
Philomastix nancarrowi : Forsius 1927: 283 (misidentification).

Philomastix glabra Froggatt 1890a: 489–490; Froggatt 1892; 201; Konow 1898: 248; Froggatt 1901; 1070; Schulz 1906: 83–84. (Synonymised, as *glaber*, with *macleaii* by Froggatt 1918: 671.)

Philomastix glaber : Froggatt 1890b: 696; Froggatt 1893: 201; Froggatt 1901: 1070, Plate; Froggatt 1907: 73, Plate XI; Froggatt 1918: 671.(Misspelling of *glabra*).

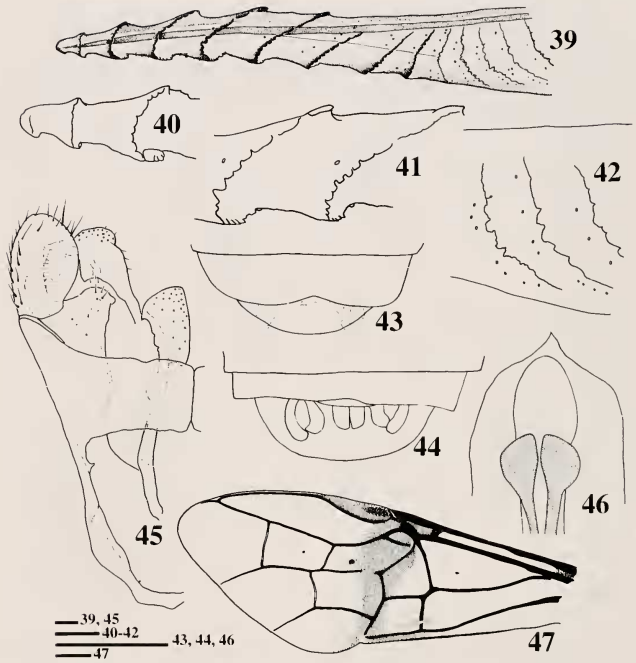
Female.—Body length 12.0–14.3 mm. Forewing length 12.2–13.7 mm. Distance between antennal sockets 2.2–2.6 times diameter of anterior. Antenna (Fig. 27) 17–19-segmented; apical 2–3 segments sometimes fused so that antenna apparently 15–18-segmented. First flagellar segment 2.5–2.9 times longer than wide. Second flagellar segment 1.6–1.9 times wider apically than basally. Mesoscutellum usually with posterolateral tubercles (Figs. 30–34); anterodorsal surface distinctly (Fig. 36) or weakly (Fig. 35) concave. Mesepisternal tubercle strong (Fig. 38). Posterolateral margin of first abdominal tergum weakly curved (Fig. 37) or straight, spiracle separated from margin by a distance 0.9–1.1 times maximum diameter of spiracle. Ovipositor sheath not posteromedially dentate (Fig. 46). Lancet as in Figs. 39–42, about 5 ctenidia terminating in dorsal tooth.

Flagellum orange-yellow. Mid lobe of mesoscutum usually with large, brown macula occupying more than half of length of lobe (Fig. 62); mid-lobe sometimes uniformly orange-yellow. Lateral lobe of mesoscutum with large, dark brown to black macula occupying most of length of lobe. Mesepisternum usually with broad, brown band adjacent to sternopleural suture. Mesosternum usually brown to anterior margin and sternopleural sulcus, sometimes entirely orange-yellow. Metascutum brown to dark brown, usually distinctly darker than cenchri. Forewing (Fig. 47) with narrow, transverse, brown band; cell 1M rarely completely brown. Abdomen predominantly dark coloured with some metallic reflections. Abdominal tergum 1 dark brown to black. Tergum 2 brown to black or metallic blue, on each side with large, cream, macula. Terga 3 and 4 dark brown, black or metallic blue, with smaller, cream lateral maculae. Terga 5, 6 and 7 each with large, cream, lateral macula; maculae narrowly separated by dark brown or black, or contiguous. Tergum 8 anteriorly dark brown to metallic blue (usually concealed by preceding tergum), posteriorly cream. Tergum 9 dark brown to black. Abdominal sterna 1 and 2 at least in part yellow or cream. Sterna 3–6 dark brown to black. Ovipositor sheath orange-yellow, with or without dark brown markings.



Figs. 27–38. *Philomastix macleaii*: 27, female antenna; 28, male antenna, basal antennomeres, frontal view; 29, male antenna, lateral view; 30–34, mesoscutellum, dorsal view, variation in shape; 35, 36, mesoscutellum, variation in surface contour as seen from rear of insect; 37, lateral panel of first abdominal tergum; 38, mesepisternum, profile. Scale lines = 1.0 mm.

Male.—Body length 11.0–12.8 mm. Forewing length 7.4–11.4 mm. Distance between antennal sockets 1.0–1.3 times diameter of anterior ocellus. Antenna (Figs. 28, 29) 18–21-segmented; apical 2 segments sometimes fused (occasionally without trace of sutures) so that antenna apparently 17–21-segmented. First flagel-



Figs. 39–47. *Philomastix macleaii*: 39–42, lancet; 43, 44, apex of male abdomen, dorsal view; 45, male genitalia, dorsal view; 46, apex of ovipositor sheath, posteroventral view; 47, forewing. Scale lines = 0.1 mm for 39–42, 45; = 1.0 mm for 43, 44, 46, 47.

lar segment 1.2–1.6 times longer than wide. Second flagellar segment 1.9–2.4 times wider apically than basally. Mesoscutum and mesepisternal tubercle as in female. Tergum 8 posteriorly with shallow emargination (Fig. 43, 44). Genitalia as in Fig. 45, paramere broad, gonolacinia not strongly hooked, penis valve apically rounded.

Clypeus and labrum orange-yellow. Mesoscutum entirely brown to dark brown (Fig. 63). Abdominal terga 5 and 6 with orange-yellow, lateral macula. Tergum 7 with lemon yellow, lateral macula.

Types.—*P. macleaii*: holotype female, "Australia" (UMO; examined). *P. glabra*: 4 syntypes, "Australasia," Dunoon, Richmond River (ANIC, on permanent loan from Macleay Museum, University of Sydney, examined).

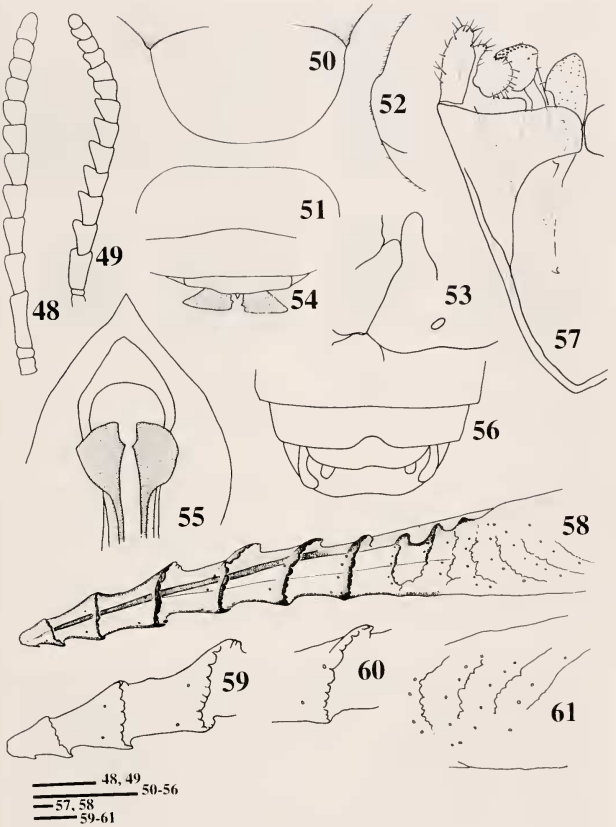
Other material examined.—Queensland: 1 male, Mt William, Eungella National Park, 1100–1200 m,19. IV. 1979, G. B. Monteith (QMBA); 1 male, Olmara Hills, via Dalrymple Heights, 1000m, 5. IV. 1975, D. K. McAlpine (AMSA); 1 female, Eungella, 25. IV. 1931, W. A. McDougall (QDPI); 1 female, Three Moon Creek, Kroombit Tops, 3–4 II. 1984, G. B. Monteith, C. Hagen, D. Yeates (QMBA); 1 female, Kroombit Tops, 1000–1100 m, 22–26. II. 1982, G. B. Monteith, G. Thompson, D. Yeates (QMBA); 1 female, Forest Station, Bulburin State Forest, 600 m, 12–13. IV. 1974, I. D. Naumann (UQIC); 2 females, Imbil, 13. V. 1937, 30. III. 1938, A. R. Brimblecombe (QDPI); 1 female, Palmwoods, 15. IV. 1911, Miss Ede (QMBA); 1 female, Montville, C. Deane (UQIC); 1 female, 6 males, Mt Kiangarow, Bunya Mountains, 27. I.1993, K. J. and C. L. Lambkin (QMBA, ANIC); 1 female, Bunya Mountains National Park, 11–13. XII. 1979, M. Schneider (UQIC); 1 female, Mt Glorious, 4. IV. 1959, K. H. L. Key (ANIC); 1 female, same locality, II. 1960, J. Bryan (UQIC); 2 females, same locality, 853 m, 13. III. 1960, R. Straatman (ANIC); 1 female, 1 male, same locality, 5–8. II. 1961, 10. IV. 1962, J. L. and M. Gressitt, Malaise trap (BPBM, USNM); 2 females, same locality, 17. I. 1963, T. Brooks (BPBM, USNM); 1 female, same locality, 1. II. 1968, H. McDougall (UQIC); 1 male, Mt Tenison-Woods, 4. II. 1983, G. Daniels (UQIC); 1 female, Highvale, 12. III. 1960, A. Cameron (UQIC); 1 female, Brisbane, 24. III. 1929, L. F. (MVMA); 1 male, same locality, III. 1953, L. W. Rule (UQIC); 5 females, Brookfield, 30. III. 1990, 2. IV. 1990, 10. IV. 1993, 20. IV. 1994, J. Grigg (UQIC, ANIC); 1 male, Toowoomba, 30. XII. 1917, J. A. Bock (UQIC); 1 female, Mt Tamborine, 1893, C. Wild (QMBA); 1 female, same locality, 20. II. 1911, W. W. Froggatt (ANIC); 1 female, same locality, 1923, W. H. Davidson (QMBA); 1 female, same locality, 21. II. 1927, H. Hacker (QMBA); 1 female, same locality, C. Deane (UQIC); 1 female, same locality (QDPI); 1 female, Boonah, 5. IV. 1948 (QDPI); 1 female, Canungra, 7. IV. 1928 (QDPI); 1 female, Cunningham's Gap, 800m, R. Eastwood (UQIC); 1 female, same locality, III. 1972, R. Baldwin (QMBA); 1 female, 1 male, Beechmont, 1. II. 1972, A. and G. Daniels (AMSA); 1 male, Mt Huntley, 1250 m, 29–30 I. 1993, G. B. Monteith (QMBA); 1 male, Bald Mountain, 1219 m, 28–31 I. 1972, I. D. Naumann (UQIC); 3 females, Upper Nerang, III. 1891, H. Tryon (QMBA, QMBA); 1 female, Upper Currumbin, 27. IV. 1932, L. Franzen (MVMA); 3 females, 1 male, McPherson Range, XI. 1928, A. J. Turner (MVMA); 1 male, same locality, H. Tryon (QDPI); 6 females, Lamington National Park, (some labelled 300 feet = 914 m), 2–3. I. 1921, 26–27. II. 1921, 1–11. III. 1921 (QMBA); 7 females, same locality, XII. 1921, H. Hacker (QMBA, ANIC); 2 males, same locality, 900–1000m, 16–18. II. 1964, J. Sedlacek (BPBM); 1 female, same locality, 930 m, 3 II. 1983, W. C. Paine (ANIC); 2 females, same locality, 914 m, 6–7. III. 1980. H. E. Evans, A. Hook (UQIC); 1 female, Binna Burra, I. 1943 (QDPI); 3 females, 2 males, Springbrook, 1930, R. Blackwood (MVMA, ANIC); 1 female, same locality, 2. XI. 1961, I. C. Cunningham (UQIC).New South Wales: 1 female, 2 males, Mt Clunie, 16. XII. 1972, I. D. Naumann (UQIC); 4 females, Tweed River, 1897 and no date (BRI, USNM, BMNH); 1 female, same locality, 1920, W. W. Froggatt (BMNH); 1 female, Wiangaree State Forest, 12. II. 1978, K. Walker (UQIC); 2 males, Richmond River (BRI); 1 male, Huonbrook, 2. III. 1964, D. K. McAlpine (AMSA); 6 females, 1 male, Glen Innes, 17 II. 1974, M. S. Moulds (AMSA, ANIC); 1 female, same locality, 19. I. 1975, R. Gallagher (BRI); 2 females, Platypus Flat camp, Wild Cattle Creek State Forest, 7 IV. 1993, C. Reid (ANIC); 1 female, 1 male, Guyra, II. 1949, A. Dyce (ANIC); 2 females, Ulong, III. 1920, W. Heron (AMSA); 11 females, Brooklana, 1929, W. Heron (BMNH, AMSA, ANIC); 1 female, Coffs Harbour, 11. I. 1950, F. D.

(MVMA); 11 females, Dorrigo, W. Heron (BMNH, MVMA, SAMAA, AMSA); 1 female, same locality, 914 m, G. Heron (USNM); 2 females, same locality (QMBA, BMNH); 1 male, same locality, 914 m, 17. II. 1932, P. J. Darlington (USNM); 1 male, same locality, 12 II. 1968, D. H. Colless (ANIC); 1 female, same locality, 14. II. 1981, D. A. Doolan (AMSA); 1 female, same locality, 13. II. 1984, L. Masner (CNC); 4 females, 1 male, Deer Vale, 12–13. I. 1931, 13. I. 1933, A. N. Burns (MVMA); 2 females, same locality, 30. I. 1972, G. Daniels (AMSA); 1 female, 4 males, Ebor, I. 1934, F. E. Wilson (MVMA, ANIC); 3 females, same locality, 12. XII. 1962, T. V. Bourke (BRI); 2 females, 3 males, Armidale, 5. II. 1915 (QMBA); 3 females, Bellangry, 2. V. 1894, W. W. Froggatt (ANIC, BRI, MVMA, CNC); 4 females, Hanging Rock, 7. I. 1955, K. M. Moore (FCNI); 1 female, Elands, 30. I. 1928 (BRI); 1 female, Comboyne Scarp, near Upper Lansdowne, 6. IV. 1987, D. K. McAlpine, S. Day, R. de Keyzer (AMSA); 1 female, Dingo State Forest, 26–27. II. 1981, G. and T. Williams (AMSA); 1 female, Bay's Hill, Taree, 28. III. 1992, G. Williams (AMSA); 9 females, 2 males, Tuncurry, 21 III. 1931, 15–25. III. 1932, no date, J. Parkes (AMSA, ANIC); 1 female, Upper Allyn River, 6. IV. 1958, R. Mackay (AMSA); 1 female, Upper Allyn, near Eccleston, 10 III. 1970, D. K. McAlpine, G. Holloway (AMSA); 1 female, 1 male, same locality, 26. II. 1970, D. K. McAlpine (AMSA); 1 female, same locality, 16. II. 1967, D. K. McAlpine (AMSA); 6 females, Maitland, 1892, W. W. Froggatt (ANIC, MVMA, USNM, BMNH); 1 female, Olney State Forest, 15. III. 1986, J. Grigg (UQIC); 5 females, Ourimbah, IV. 1904, S. W. Jackson (AMSA); 1 female, Narara, 23 I. 1911 (AMSA); 1 female, same locality, 2. III. 1950, P. C. Hely (BRI); 2 males, Upper Colo, 10. III. 1990, G. R. Brown, M. A. Terras (BRI); 4 females, 8 males, Mt Wilson, 4. I. 1931, A. N. Burns (MVMA); 1 female, same locality, 7 II. 1959, D. K. McAlpine (AMSA); 1 female, same locality, II. 1921 (AMSA); 1 male, same locality, 1067 m, I. 1932, P. J. Darlington (USNM); 1 female, Hartley Vale, 29. III. 1975, G. Daniels (AMSA); 3 females, Mt York, 21. III. 1964, D. K. McAlpine (AMSA, ANIC); 2 males, Katoomba, 26. I. 1955, K. M. Moore (FCNI); 2 females, 1 male, same locality, 21. II. 1969, G. Hardy (AMSA); 2 females (with eggs), Woodford, 28. II. 1984, M. Hill (BRI); 1 female, 2 males, Beecroft, 18. II. 1968, O. M. Williams (BRI, ANIC); 2 females, same locality, 18. III. 1967, C. E. Chadwick (BRI, ANIC); 5, females, Glenbrook, III. 1994, L. Turton (BRI, ANIC); 1 female, 2 males, Lane Cove, 27. IV. 1946, 30. III. 1947, 3. IV. 1948 (AMSA); 1 male, Sydney, 13. III. 1932, G. A. Waterhouse (MVMA); 1 female, same locality, III. 1949, A. Dyce (ANIC); 1 female, same locality, III. 1977, D. Clyne (ANIC). 1 male, Heathcote, 20. III. 1952, L. Cascysand (BRI); 1 female, Heathcote National Park, 24. IV. 1994, Cowdrey (AMSA); 2 males, Mt Keira, 23. II. 1983, G. A. Holloway (AMSA); 1 male, Jamberoo Mtn, 16. II. 1963, C. E. Chadwick (BRI); 1 male, Jamberoo, 11. I. 1950 (AMSA). Unlocalised: 1 female, 1 male, W. Heron (BMNH); 2 females, 1 male (QDPI); 1 female (MVMA); 3 females, 1 male (UQIC); 1 female (QMBA); 1 female (ANIC).

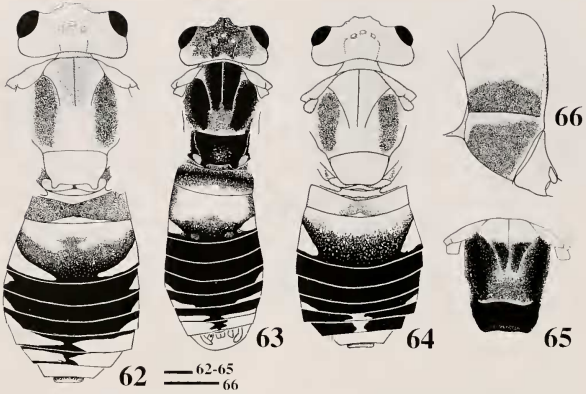
Distribution.—See Fig. 76. Several females in the ANIC and the BMNH are labelled "Brooklana Sydney." Since Brooklana and Sydney are approximately 400 km apart, clearly mislabelling has occurred. Reliably labelled specimens indicate that *P. macleaii* occurs at both Brooklana and Sydney. *P. macleaii* was not recorded from Victoria by Bruzzese (1980) in a survey of insects on *Rubus.*

Larval host plants.—Rosaceae: *Rubus moluccanus* L. (Froggatt 1893); *Rubus rosifolius* Smith.

Discussion.—There is some variation in wing venation. In the forewing, R1 may continue beyond the junction with Rs. In the hindwing cross-vein m-cu may be



Figs. 48–61. *Philomastix xanthophylax*: 48, female antenna; 49, male antenna; 50, mesoscutellum, dorsal view; 51, mesoscutellum, surface contour as seen from rear of insect; 52, mesepisternum, profile; 53, lateral panel of first abdominal tergum; 54, apex of ovipositor sheath, dorsal view; 55, same, posteroventral view; 56, apex of male abdomen, dorsal view; 57, male genitalia, dorsal view; 58–61, lancet. Scale lines = 1.0 mm for 48–56; = 0.1 mm for 57–61.



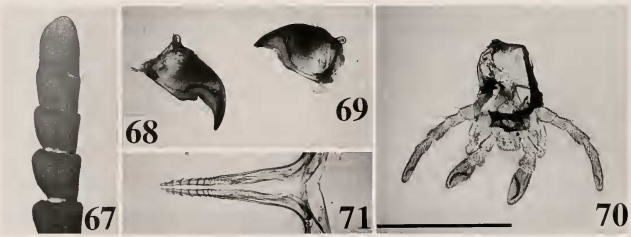
Figs. 62–66. *Philomastix* spp.: 62, *P. macleaii*, female, dorsal view; 63, *P. macleaii*, male, dorsal view; 64, *P. nancarrowi*, female, dorsal view; 65, P. *nancarrowi*, male thorax (part), dorsal view; 66, *P. nancarrowi*, female mesepisternum, lateral view. Scale lines = 1.0 mm.

present or absent. The mesoscutellar tubercles are usually strong (Figs. 30, 31) but may be weak (Fig. 32), absent on one side (Fig. 33) or absent altogether (Fig. 34). Cell 1M is usually at least in part hyaline proximally, but in the female from Eungella cell 1M is entirely dark and the infuscation extends to cell R.

Philomastix xanthophylax Naumann and Groth, sp. n.

(Figs. 1, 48–61, 67–74, 76)

Female.—Body length 9.0–12.0 mm. Forewing length 9.4–11.5 mm. Distance between antennal sockets 2.2–2.6 times greater than diameter of anterior ocellus. Antenna (Figs. 48, 67) 14–16 segmented;



Figs. 67–71. *Philomastix xanthophylax*: 67, female, apical antennomeres; 68, left mandible; 69, right mandible; 70, labium, maxilla; 71, lancets, ventral view. Scale line = 1.0 mm, for 68–70; see 48, 58 for scale to 67, 71.

Figs. 72–74. *Philomastix xanthophylax* on *Alphitonia excelsa*; 72, two adult females, one guarding egg mass, other guarding batch of first instar larvae; 73, batch of first instar larvae; 74, third instar larva. Adult sawflies in 72 each approximately 9.5 mm long; larvae in 73, 74 approximately 5 and 17 mm long respectively.

apical 2–5 segments sometimes fused so that antenna apparently 12–13-segmented. First flagellar segment 2.9–3.0 times longer than wide. Second flagellar segment 1.8–1.9 times wider apically than basally. Mesoscutellum without posterolateral tubercles (Fig. 50); anterodorsal surface more or less flat (Fig. 51). Mesepisternal tubercle weak (Fig. 52). Posterolateral margin of first abdominal tergum weakly curved (Fig. 53) or straight, spiracle separated from margin by a distance 1.2–1.3 times maximum diameter of spiracle. Ovipositor sheath posteromedially dentate (Figs. 54, 55). Lancet as in Figs. 58–61, 71, about 8 ctenidia terminating in dorsal tooth, antior teeth strong.

Flagellum black (Fig. 1). Mid lobe of mesoscutum orange-yellow. Lateral lobe of mesoscutum orange-yellow, sometimes with small, brown macula less than half as long as lobe. Mesepisternum without brown band adjacent to sternopleural suture. Mesosternum brown, with orange-yellow band along anterior and lateral margins. Metascutum and cenchri orange-yellow. Forewing with narrow, transverse, brown band; cell 1M not completely brown. Abdomen entirely orange-yellow.

Male.—Body length 7.3–8.9 mm. Fore-

Fig. 75. Distribution of Philomastiginae: world distribution of *Philomastix*, *Cerospastus* and *Ecopatus*.

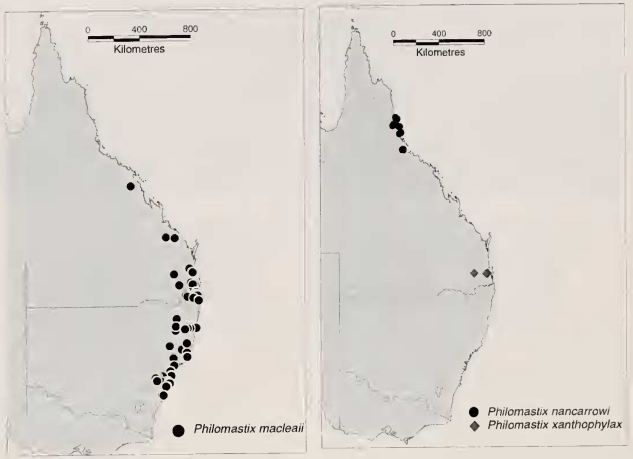


Fig. 76. Australian distribution of *Philomastix nancarrowi*, *P. macleaii* and *P. xanthophylax*.

wing length 6.5–8.8 mm. Distance between antennal sockets 1.3–1.7 times greater than diameter of anterior ocellus. Antenna (Fig. 49) 15-segmented. First flagellar segment 1.7–1.8 times longer than wide. Second flagellar segment 2.0–2.1 times wider apically than basally. Mesoscutellum without posterolateral tubercles; dorsally slightly concave. Mesepisternal tubercle weak. Abdominal tergum 8 posteriorly with deep emargination (Fig. 56). Genitalia as in Fig. 57, paramere slender, gonolacinia strongly hooked, penis valve apically rounded.

Clypeus and labrum lemon-yellow. Mid-lobe of mesoscutum orange-yellow. Lateral lobe of mesoscutum entirely brown to dark brown. Abdominal terga 5 and 6 without orange-yellow, lateral maculae. Tergum 7 with lemon-yellow, lateral macula.

Material examined.—Holotype female, 27.28S 151.56E, 10 km N Toowoomba, Queensland, 12. IV. 1992, H. Groth (ANIC). Paratypes: Queensland: 2 females, same data as holotype (ANIC, HGCN); 8 females, same locality and collector as holotype, 3. IV. 1991, 1. III. 1992, 29. III. 1992, 16. III. 1992 (ANIC, BMNH, USNM, HGCN); 4 males, same locality and collector as holotype, but labelled "Highfields," reared from eggs collected V. 1992, emerged as adults 30. III. 1993, 22. IV. 1993, 24. IV. 1993, 26. IV. 1993 (ANIC, HGCN); 3 females, 4 males, Brookfield, 22. III. 1994, 29. III. 1994, 3. IV. 1994, J. Grigg (UQIC, ANIC); 2 females, Bellbird Park, Brisbane, IV. 1994, R. Nattrass (QMBA).

Etymology.—The species name is derived from the Greek words *xanthos*, yellow or golden, and *phylax*, a guard, with reference to the maternal guarding behaviour common to all species of *Philomastix*.

Distribution.—See Fig. 76.

Larval food plants.—*Alphitonia excelsa* (Fenzl) Benth. (Rhamnaceae).

Discussion.—There is conspicuous variation in wing venation within the type series. In the forewing: (1) R1 sometimes continues as a short spur beyond the junction of R1 and Rs; (2) there may be one, two or no cross-veins between C and R; (3) there may be an incomplete cross-vein distal to 3r-m; and (4) a diagonal vein sometimes defines a small, triangular cell in the anterobasal corner of cell 3M. In the hindwing cross-vein m-cu is rather variable: (1) it may be present or absent; (2) it may curve smoothly into CuA, in which case there is no distal abscissa of CuA; (3) it may join M before or after the junction of cross-vein 2r-m and M.

CEROSPASTUS Konow

Cerospastus Konow 1899: 404–405; Konow 1905: 36–37; Rohwer 1911: 76. Benson 1935: 224. Benson 1938: 379; Pagliano and Scaramozzino 1990: 58; Smith 1990: 21–23; Abe and Smith 1991: 18. Type species: *Cerospastus volupis* Konow (by monotypy).

Ceratospastus: Schulz 1906: 84 (unjustified emendation).

Female.—Vertex conspicuously setose. Face with some fine microsculpture. Malar space narrower than diameter of anterior ocellus. Antenna (Fig. 3) 14-(-20, Smith 1990) segmented, weakly serrate, weakly clavate. Right mandible simple (Smith 1990). Maxillary palp (Fig. 9) 6-segmented, filiform, without sensory cup. Labial palp 4-segmented, without sensory cup. Labium tri-lobed. Thorax dorsally conscicuously setose. Notauli, median mesoscutal line deeply impressed. Mesoscutellum not swollen, posterior margin visible from above. Mesepisternum without tubercle. Metascutellum not band like. Forewing (Fig. 4) with closed radial cell and 4 cubital cells; median and second cubital cells each with nygma.Abdominal terga not conspicuously setose. Second tergum predominantly fine transversely striate. Cercus present. Ovipositor sheath not strongly expanded posteriorly.

Male.—Antenna 20-segmented (19–21 according to Smith 1990), strongly serrate. Median cell of forewing without nygma. Eighth tergum posteriorly with very deep, broad emargination (Fig.7).

Cerospastus volupis Konow
(Figs. 3, 4, 7, 9, 76)

Cerospastus volupis Konow 1899: 404; Konow 1905: 37; Rohwer 1911: 76; Smith 1978: 160; Oehlke and Wudowenz 1984: 419; Pagliano and Scaramozzino 1990: 58; Smith 1990: 22–23; Smith 1993: 11.

Female.—Body length 10.0–11.5 mm. Forewing length 11.0–12.0 mm. Distance between antennal sockets 1.2–1.7 times greater than diameter of anterior ocellus. First flagellar segment 2.5 times longer than wide. Second flagellar segment 1.7–2.0 times wider apically than basally. Mesoscutellum without posterolateral tubercles, posterior margin convex; dorsal surface weakly convex. Mesepisternum without tubercles. Posterolateral margin of first abdominal tergum smoothly curved or slightly angulate, spiracle separated from margin by a distance 0.5–1.3 times maximum diameter of spiracle. Ovipositor sheath not posteromedially dentate. Lancet as in Smith (1990: Fig. 34).

Flagellum very pale brown, scape and pedicel orange-yellow. *Either*: head predominantly orange-yellow; upper frons with transverse brown joining upper extremities of compound eyes and encompassing ocellar triangle; *or* most of frons, lowermost gena, vertex medially brown. Mandibles brown, remaining mouthparts orange-yellow. Thorax and legs predominantly orange-yellow to cream. Mesonotum orange-yellow, with brown maculae occupying either most of length of mid and lateral lobes or only anterior half of lateral lobe. Cenchri, metascutum, most of mid and hind tarsi, first abdominal tergum and sometimes also ventral surfaces of thorax brown to pale brown. Remain-

der of abdomen orange to yellow. Wings hyaline with faint yellow tinge.

Male.—Body length 7.5 mm. Forewing length 7.3 mm. distance between antennal sockets 0.7–0.8 times greater than diameter of anterior ocellus. First flagellar segment 1.3 times longer than wide. Second flagellar segment 2.4 times wider apically than basally. Mesoscutellum, mesepisternum as in female. Genitalia as in Smith (1990: Fig. 31).

Head, thorax predominantly black to dark brown. Antenna pale brown. Clypeus orange-brown. Mandibles red-brown. Maxilla, labium orange-yellow. Spiracular lobe of pronotum orange-yellow. Legs orange to yellow. Abdomen dorsally dark brown to brown, ventrally orange to yellow. Wings hyaline with faint brown tinge.

Type.—Lectotype female (designated by Smith 1990), Valdivia, Chile, 1897, Lossberg (DEIC; examined).

Other material examined.—1 female, 1 male, Parque Nac. Conguillio. Province Temuco, Chile, 31. XII. 1976, O. Puentes (USNM).

Distribution.—Known only from a few specimens from central western Argentina (Neuquén Province) and central Chile (Cautin, Malleco, Maule and Valdivia).

Larval host plant.—*Nothofagus* sp. (Fagaceae) (Smith 1990).

ECOPATUS Smith

Ecopatus Smith 1990: 23–24. Type species: *Ecopatus penai* Smith (by original designation and monotypy).

Female.—Vertex almost bare. Face almost completely smooth. Malar space very slightly wider than diameter of anterior ocellus. Antenna (Fig. 2) 18-segmented (20–21 according to Smith 1990), filiform, not clavate. Right mandible with 2 inner teeth. Maxillary palp (Fig. 8) 6-segmented, 4th segment apically distinctly wider than other segments; apical segment without sensory cup. Labial palp 4-segmented, apical segment without sensory cup. Labium tri-lobed. Thorax dorsally almost bare of setae. Notauli, median mesoscutal line shallow. Mesoscutellum not swollen, posterior margin visible from above. Mesopleuron without tubercle. Metascutellum not band like. Forewing (Fig. 5) with open radial cell and 2–3 cubital cells; median and second cubital cells each with nygma. Abdominal terga dorsally not conspicuously setose. Second tergum with faint, reticulate microsculpture. Cercus present. Ovipositor sheath not strongly expanded posteriorly.

Male.—Unknown.

Ecopatus penai Smith
(Figs. 2, 5, 6, 8)

Ecopatus penai Smith 1990: 24–25.

Female.—Body length 6.0–7.0 mm. forewing length 7.7 mm. distance between antennal sockets 2.3–2.4 times greater than diameter of anterior ocellus. first flagellar segment 3.6–3.7 times longer than wide. Second flagellar segment 1.1–1.2 times wider apically than basally. Mesoscutellum without tubercles; anterodorrsal surface convex. Mesepisternum without tubercle. Posterolateral margin of first abdominal tergum sinuate (Fig. 6), spiracle separated from margin by distance 4.6 times maximum diameter of spiracle. Ovipositor sheath not medially dentate. Lancet as in Smith (1990: Fig. 39).

Head, thorax, abdomen predominantly dark brown to black. Following orange, orange-yellow to cream: scape or scape and pedicel, frons just above and below antennal sockets, clypeus, mandible (excluding red-brown teeth), maxilla, labium, posterior margin of pronotum, tegula, axillar sclerites, large macula anterodorsal to extremity of mesepisternum, legs (except pale brown extremities of tarsi), abdomen ventrally. Wings uniformly strongly brown tinged.

Types.—Holotype female, Caramavida,

Province Arauco, 5–10. II. 1953, L. Peña (USNM; not seen). Paratypes: 2 females, same data as holotype (not seen); 1 female, Curacautin, Rio Blanco, 27–31. I. 1950, L. Peña (USNM) (examined).

Distribution.—Known only from a few specimens from central Chile (Araucan and Curacautin Provinces).

Larval host plants.—Unknown.

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